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Amendments to the Figures

Figures 1-2 have been amended by adding the label "(RELATED ART)" below each Figure, as required by the Examiner. Replacement Sheets (as required by 37 C.F.R. 1.121(d)) are attached to this Amendment.

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Amendment to the Abstract

Please replace the Abstract on page 41 with the following replacement Abstract:

Methods, ~~algorithms,~~ software, architectures, systems and circuits for targeting certain dominant error types in an adaptive FIR filter and/or signal equalizer. The method ~~and algorithm generally~~ include<u>s</u> processing a data sequence in accordance with the adaptive algorithm to produce a processed data sequence, filtering the data sequence to generate a filtered data term ~~for the adaptive algorithm,~~ generating a filtered error term ~~for the adaptive algorithm~~ from at least the processed data sequence~~-~~, and updating the adaptive ~~algorithm~~ <u>filter</u> in response to the filtered data and error terms. ~~The software is generally configured to implement one or more aspects of the inventive methods disclosed herein.~~ The architectures generally include an equalizer configured to equalize and/or filter a data sequence ~~in accordance with an adaptive algorithm~~ and provide an equalized data output, a first filter configured to receive the data sequence and generate a filtered data term ~~for the adaptive algorithm,~~ and an error term circuit configured to receive the equalized data output and provide a filtered error term ~~for the adaptive algorithm. The filters may be structurally and/or functionally identical to each other. The systems generally include the architecture and, for example, a receiver and/or magnetic recording device.~~ The present invention advantageously improves convergence speed relative to conventional LMS algorithms for FIR filtering of digital data, and improved performance relative to LMS algorithms that are best-in-class for convergence speed.

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Remarks

Applicants' undersigned representative wishes to thank Examiner Malek for the thorough examination of the present application and (with Supervisory Primary Examiner Ghayour) for the helpful and courteous discussion held with the undersigned on March 22, 2007. The claims have been amended as discussed. The following remarks shall summarize and further expand upon topics discussed.

Support for the amendments to Claims 1, 30, 49 and 74 can be found in the specification in paragraphs [0036]-[0037] and [0040] and in Claims 72, 95 and 113 and FIG. 3 as originally filed. Support for the amendments to Claim 17 can be found in Claim 1 as originally filed and in the support for the amendments to Claim 1 above. Support for the amendments to Claim 44 can be found in Claim 30 as originally filed and in the support for the amendments to Claims 1, 30, 49 and 74 above. Amendments to the remaining claims are for consistency with the amendments to the independent claims or to correct inadvertent errors. Thus, no new matter is introduced.

The Rejection of Claims 1-3, 7, 8, 10, 12-14, 30, 32-36, 38, 40-42, 49-52, 58-61, 67, 71, 74-76, 82-86, 91, 93, 97-99, 106, 109, 110 and 115 under 35 U.S.C. § 102(b)

The rejection of Claims 1-3, 7, 8, 10, 12-14, 30, 32-36, 38, 40-42, 49-52, 58-61, 67, 71, 74-76, 82-86, 91, 93, 97-99, 106, 109, 110 and 115 under 35 U.S.C. § 102(e) as being anticipated by Alelyunas et al. (U.S. Pat. No. 6,285,709; hereinafter "Alelyunas") has been obviated by appropriate amendment.

Alelyunas discloses an apparatus and methods of compensating for distortions introduced in communication signals received over a telephone network. An adaptive linear equalizer (LE) pre-filter is used in conjunction with an adaptive decision feedback equalizer (DFE) to provide error filtering. An error signal is generated relative to the difference between the determined states of the decision mechanism of the DFE and the filtered communication signals from the LE. Further, an error filter provides a filtered output of the generated error signal, wherein the

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error filter has an error filter characteristic defined in accordance with the known telephone network transmission medium. The LE for the received sampled communication signals has a LE pre-filter characteristic defined in accordance with the filtered output of the error filter, using a recursive least-mean-square (LMS) technique (see the Abstract of Alelyunas).

In the embodiment of FIG. 3, LE 86 provides its output to a DFE 90 such that weighting coefficients Ck 88 and Cj 92 are both provided in response to an error signal 94 from the DFE 90 (see also col. 5, ll. 11-14 of Alelyunas). Thus, in this embodiment, the scheme of Alelyunas feeds back only a single term (error signal 94) to provide weighting coefficients Ck 88 and Cj 92 to LE 86 and DFE 90.

In the embodiment of FIG. 4, the error signal 94 (from the DFE 90, and which provides the same weighting coefficients Cj 92 as in FIG. 3) is filtered by an LE error filter 102 to provide an error signal 104 which has been filtered for use in updating tap weights Ck 88 in the LE 86. (see also col. 5, ll. 30-35 of Alelyunas). In this embodiment, the scheme of Alelyunas feeds back two terms (error signal 94 and filtered error signal 104) from a serial or linear path to provide weighting coefficients to LE 86 and DFE 90.

Finally, in the embodiment of FIG. 5, the error signal 94 (from the DFE 90) is filtered by LE error filter 102 (as in FIG. 4) to provide filtered error signal 104 and by DFE error filter 108 to provide error signal 110. Filtered error signal 104 is used in updating tap weights Ck 88 in the LE 86, and error signals 110 is used to update or adjust the tap weights Cj 92 (see also col. 6, ll. 1-11 of Alelyunas). However, in this embodiment, the scheme of Alelyunas feeds back two error terms (filtered error signals 104 and 110) from the error signal 94 provided by DFE 90.

Alelyunas does not appear to update the LE and/or DFE coefficients with each of a filtered *data* term and a filtered error term, where the filtered data term is generated from a data sequence that is also (separately) processed in accordance with the coefficients (see, e.g., the first, second and fourth elements of Claims 1, 17, 30 and 44, the first, second and third elements of Claims 49 and 74). As a result, Alelyunas does not disclose all of the limitations of the present claims.

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Thus, for at least these reasons, the rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 17-26, 28, 29, 44-48, 69 and 116 under 35 U.S.C. § 103(a)

The rejection of Claims 17-26, 28, 29, 44-48, 69 and 116 under 35 U.S.C. § 103(a) as being unpatentable over Alelyunas is respectfully traversed.

As discussed above, Alelyunas does not appear to disclose updating the LE and/or DFE coefficients with a filtered *data* term. In fact, Alelyunas does not appear to process any signal other than error signal 94 (output from DFE 90), the input of LE 86 (which is not processed by anything other than LE 86), and the output of LE 86 (which is input only into DFE 90). Thus, to the extent that Alelyunas discloses a filtered data term, Alelyunas does not appear to suggest updating coefficients with it.

Thus, for at least these reasons, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 4, 9, 37, 53-55, 62, 63, 77-79, 87-89, 100, 101, 104 and 105 under 35 U.S.C. § 103(a)

The rejection of Claims 4, 9, 37, 53-55, 62, 63, 77-79, 87-89, 100, 101, 104 and 105 under 35 U.S.C. § 103(a) as being unpatentable over Alelyunas in view of the Background of the Invention from the present application (incorrectly characterized as "Applicant's admitted prior art") is respectfully traversed.

As discussed above, Alelyunas does not appear to disclose or suggest updating the LE and/or DFE coefficients with a filtered *data* term. Thus, Alelyunas is saliently deficient with regard to the present claims. The Background from the present application, to the extent Applicants' own application is available against them, fails to cure the deficiencies of Alelyunas.

Firstly, at no point have Applicants or any of Applicants' representatives admitted that any part of the present application constitutes prior art. Thus, Applicant hereby traverses any

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effective assertion of official notice that the Background of the present application is admitted prior art or is otherwise available as prior art against the present claims. The Examiner is invited to rely on a self-executed Affidavit attesting to personal knowledge of facts establishing such technology as prior art available under 35 U.S.C. § 102 against the claims:

> "If the examiner is relying on personal knowledge to support the finding of what is known in the art, the examiner must provide an affidavit or declaration setting forth specific factual statements and explanation to support the finding." M.P.E.P. § 2144.03, citing 37 C.F.R. 1.104(d)(2).

Consequently, any further Office Action must provide documentary evidence if this rejection is to be maintained. See M.P.E.P. § 2144.03; see also *In re Zurko*, 258 F.3d at 1386, 59 USPQ2d at 1697 ("[T]he Board [or examiner] must point to some concrete evidence in the record in support of these findings" to satisfy the substantial evidence test).

That being said, even if one assumes for the sake of argument that the Background from the present application is available against the present claims, it does not cure the deficiencies of Alelyunas with regard to the present claims. At no point does Alelyunas or the Background from the present application suggest updating coefficients in a filter with each of a filtered *data* term and a filtered error term. Thus, for at least these reasons, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 11 and 39 under 35 U.S.C. § 103(a)

The rejection of Claims 11 and 39 under 35 U.S.C. § 103(a) as being unpatentable over Alelyunas in view of Lu (U.S. Patent No. 6,768,796) is respectfully traversed.

As discussed above, Alelyunas does not appear to disclose or suggest updating the LE and/or DFE coefficients with a filtered *data* term. Thus, Alelyunas is saliently deficient with regard to the present claims. Lu fails to cure the deficiencies of Alelyunas.

Lu discloses methods and systems for echo cancellation (Title and Abstract, line 1). In particular, Lu discloses a coefficient vector generator ("CVG") 460 that appears to receive a

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filtered far end signal x(n) and an echo residual signal e(n) (col. 5, ll. 20-23 and 57-59, and FIG. 8 of Lu). A whitening means 495 such as a whitening filter that causes frequency domain spectrums of the far end signal x(n) signal and r(n) signal (from which echo residual signal e(n) is derived) to have flat frequency characteristics (col. 9, l. 65-col. 10, l. 7, and FIG. 8 of Lu).

However, Lu does not affirmatively disclose updating coefficients with the filtered far end signal and the echo residual signal e(n), nor it is readily apparent from the disclosure of Lu that the filtered far end signal and the echo residual signal e(n) represent both a filtered data term and a filtered error term. As a result, Lu fails to cure the deficiencies of Alclyunas with regard to the present claims.

Thus, for at least these reasons, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 1-48 under 35 U.S.C. § 101

The rejections of Claims 1-48 under 35 U.S.C. § 101 have been obviated by appropriate amendment.

The Rejections of Claims 1-116 under 35 U.S.C. § 112, Second Paragraph

The rejections of Claims 1-116 under 35 U.S.C. § 112, second paragraph, have been obviated by appropriate amendment.

The Objections to the Drawings and the Abstract

The objections to the drawings and the Abstract have been overcome by appropriate amendment.

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Conclusions

In view of the above amendments and remarks, all bases for objection are overcome, and the application is in condition for allowance. Early notice to that effect is earnestly requested.

If it is deemed helpful or beneficial to the efficient prosecution of the present application, the Examiner is invited to contact Applicant's undersigned representative by telephone.

Respectfully submitted,

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